

**COMMERCIAL-SCALE DEMONSTRATION OF THE  
LIQUID PHASE METHANOL (LPMEOH™) PROCESS**

**DRAFT ENVIRONMENTAL MONITORING REPORT NO. 4**

**For The Period**

**1 January - 31 March 1998**

**Prepared by**

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**and**

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**for the**

**Air Products Liquid Phase Conversion Company, L.P.**

**Prepared for the United States Department of Energy  
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## ACRONYMS AND DEFINITIONS

Acurex	-	Acurex Environmental Corporation (now ARCADIS, Geraghty & Miller)
Air Products	-	Air Products and Chemicals, Inc.
AFDU	-	Alternative Fuels Development Unit - The "LaPorte PDU"
Balanced Gas	-	A syngas with a composition of hydrogen (H <sub>2</sub> ), carbon monoxide (CO), and carbon dioxide (CO <sub>2</sub> ) in stoichiometric balance for the production of methanol
BOD	-	Biochemical Oxygen Demand
Carbon Monoxide Gas	-	A syngas containing primarily carbon monoxide (CO); also called CO Gas
Crude Grade Methanol	-	Underflow from rectifier column (29C-20), defined as 80 wt% minimum purity; requires further distillation in existing Eastman equipment prior to use
DME	-	dimethyl ether
DOE	-	United States Department of Energy
DOE-FETC	-	The DOE's Federal Energy Technology Center (Project Team)
DOE-HQ	-	The DOE's Headquarters - Coal Fuels and Industrial Systems (Project Team)
DTP	-	Demonstration Test Plan - The four-year Operating Plan for Phase 3, Task 2 Operation
DVT	-	Design Verification Testing
Eastman	-	Eastman Chemical Company
EIV	-	Environmental Information Volume
EMP	-	Environmental Monitoring Plan
EMR	-	Environmental Monitoring Report
EPRI	-	Electric Power Research Institute
HAPs	-	Hazardous Air Pollutants
Hydrogen Gas	-	A syngas containing an excess of hydrogen (H <sub>2</sub> ) over the stoichiometric balance for the production of methanol; also called H <sub>2</sub> Gas
IGCC	-	Integrated Gasification Combined Cycle, a type of electric power generation plant
IGCC/OTM	-	An IGCC plant with a "Once-Thru Methanol" plant (the LPMEOH™ Process) added-on
KSCF	-	Thousand Standard Cubic Feet
KSCFH	-	Thousand Standard Cubic Feet per Hour
LaPorte PDU	-	The DOE-owned experimental unit (PDU) located adjacent to Air Products' industrial gas facility at LaPorte, Texas, where the LPMEOH™ process was successfully piloted
LDAR	-	Leak Detection and Repair
LPDME	-	Liquid Phase DME process, for the production of DME as a mixed coproduct with methanol
LPMEOH™	-	Liquid Phase Methanol (the technology to be demonstrated)
Main Plant Purge	-	Unreacted synthesis gas stream from LPMEOH™ process returned to Eastman's fuel gas header
mg/m <sup>3</sup>	-	Milligrams per cubic meter
NEPA	-	National Environmental Policy Act
NPDES	-	National Pollutant Discharge Elimination System
OSHA	-	Occupational Safety and Health Administration
Partnership	-	Air Products Liquid Phase Conversion Company, L.P.
PDU	-	Process Development Unit
PFD	-	Process Flow Diagram(s)
ppbv	-	parts per billion (volume basis)
Project	-	Production of Methanol/DME Using the LPMEOH™ Process at an Integrated Coal Gasification Facility
psia	-	Pounds per Square Inch (Absolute)
psig	-	Pounds per Square Inch (gauge)
P&ID	-	Piping and Instrumentation Diagram(s)
RCRA	-	Resource and Conservation Recovery Act
Refined Grade Methanol	-	Distilled methanol, defined as 99.8wt% minimum purity; used directly in downstream Eastman processes
SCFH	-	Standard Cubic Feet per Hour
Sl/hr-kg	-	Standard Liter(s) per Hour per Kilogram of Catalyst

ACRONYMS AND DEFINITIONS (cont'd)

Syngas	-	Abbreviation for Synthesis Gas
Synthesis Gas	-	A gas containing primarily hydrogen (H <sub>2</sub> ) and carbon monoxide (CO), or mixtures of H <sub>2</sub> and CO; intended for "synthesis" in a reactor to form methanol and/or other hydrocarbons (synthesis gas may also contain CO <sub>2</sub> , water, and other gases)
Tie-in(s)	-	the interconnection(s) between the LPMEOH™ Process Demonstration Facility and the Eastman Facility
TOC	-	Total Organic Carbon
TLV	-	Threshold Limit Value
TPD	-	Ton(s) per Day
WBS	-	Work Breakdown Structure
wt	-	Weight

## **1. Introduction**

The Liquid Phase Methanol (LPMEOH™) Demonstration Project at Kingsport, Tennessee, is a \$213.7 million effort being conducted under a cooperative agreement between the U.S. Department of Energy (DOE) and Air Products Liquid Phase Conversion Company, L.P. (the Partnership). Air Products and Chemicals, Inc. (Air Products) and Eastman Chemical Company (Eastman) formed the Partnership to execute the Demonstration Project. A demonstration unit producing 80,000 gallons per day (260 tons-per-day (TPD)) of methanol from coal-derived synthesis gas (syngas) was designed, constructed, and began a four-year operational period in April of 1997 at a site located at the Eastman complex in Kingsport. The Partnership will own and operate the facility for the four-year demonstration period.

This project is sponsored under the DOE's Clean Coal Technology Program, and its primary objective is to "demonstrate the production of methanol using the LPMEOH™ Process in conjunction with an integrated coal gasification facility." The project will also demonstrate the suitability of the methanol produced for use as a chemical feedstock or as a low-sulfur dioxide, low-nitrogen oxides alternative fuel in stationary and transportation applications. The project may also demonstrate the production of dimethyl ether (DME) as a mixed coproduct with methanol, if laboratory- and pilot-scale research and market verification studies show promising results. If implemented, the DME would be produced during the last six months of the four-year demonstration period.

The LPMEOH™ process is the product of a cooperative development effort by Air Products and the DOE in a program that started in 1981. It was successfully piloted at a 10-TPD rate in the DOE-owned experimental unit at Air Products' LaPorte, Texas, site. This Demonstration Project is the culmination of that extensive cooperative development effort.

## **2. Project Description**

The demonstration unit, which occupies an area of 0.6 acre, is integrated into the existing 4,000-acre Eastman complex located in Kingsport, Tennessee. The Eastman complex employs approximately 12,000 people. In 1983, Eastman constructed a coal gasification facility utilizing Texaco technology. The syngas generated by this gasification facility is used to produce carbon monoxide and methanol. Both of these products are used to produce methyl acetate and ultimately cellulose acetate and acetic acid. The availability of this highly reliable coal gasification facility was the major factor in selecting this location for the LPMEOH™ Process Demonstration. Three different feed gas streams (hydrogen gas or H<sub>2</sub> Gas, carbon monoxide gas or CO Gas, and Balanced Gas) will be diverted from existing operations to the LPMEOH™ Demonstration Unit, thus providing the range of syngas ratios (hydrogen to carbon monoxide) needed to meet the technical objectives of the Demonstration Project.

For descriptive purposes and for design and construction scheduling, the project has been divided into four major process areas with their associated equipment:

- *Reaction Area* - Syngas preparation and methanol synthesis reaction equipment.
- *Purification Area* - Product separation and purification equipment.
- *Catalyst Preparation Area* - Catalyst and slurry preparation and disposal equipment.
- *Storage/Utility Area* - Methanol product, slurry, and oil storage equipment.

The physical appearance of this facility closely resembles the adjacent Eastman process plants, including process equipment in steel structures.

- *Reaction Area*

The reaction area includes feed gas compressors, catalyst guard beds, the reactor, a steam drum, separators, heat exchangers, and pumps. The equipment is supported by a matrix of structural steel. The most salient feature is the reactor, since with supports, it is approximately 84-feet tall.

- *Purification Area*

The purification area features two distillation columns with supports; one is approximately 82-feet tall, and the other 97-feet tall. These vessels resemble the columns of the surrounding process areas. In addition to the columns, this area includes the associated reboilers, condensers, air coolers, separators, and pumps.

- *Catalyst Preparation Area*

The catalyst preparation area consists of a building with a roof and partial walls, in which the catalyst preparation vessels, slurry handling equipment, and spent slurry disposal equipment are housed. In addition, a hot oil utility system is included in the area.

- *Storage/Utility Area*

The storage/utility area includes two diked lot-tanks for methanol, two tanks for oil storage, a slurry holdup tank, a trailer loading/unloading area, and an underground oil/water separator. A vent stack for safety relief devices is located in this area.

### **3. Process Description**

The LPMEOH™ Demonstration Unit is integrated with Eastman's coal gasification facility. A simplified process flow diagram is included in Appendix A. Syngas is introduced into the slurry reactor, which contains a slurry of liquid mineral oil with suspended solid particles of catalyst. The syngas dissolves through the mineral oil, contacts the catalyst, and reacts to form methanol. The heat of reaction is absorbed by the slurry and is removed from the slurry by steam coils. The methanol vapor leaves the reactor, is condensed to a liquid, sent to the distillation columns for removal of higher alcohols, water, and other impurities, and is then stored in the day tanks for sampling before being sent to Eastman's methanol storage. Most of the unreacted syngas is recycled back to the reactor with the syngas recycle

compressor, improving cycle efficiency. The methanol will be used for downstream feedstocks and in off-site fuel testing to determine its suitability as a transportation fuel and as a fuel for stationary applications in the power industry.

### Demonstration Test Plan

Following the start-up of the LPMEOH™ Demonstration Unit, a four-year test plan is being performed by Air Products and Eastman. The goals of the Test Plan are structured to meet the commercialization objectives for the LPMEOH™ Process. Excerpts from *Commercialization Objectives from the program Statement of Work* are included here to provide the global perspective of the Demonstration Plan:

#### "Primary Objective

The primary objective of the Project is to demonstrate the commercial scale production of methanol using the LPMEOH™ Process...

The LPMEOH™ Process technology is expected to be commercialized as part of an IGCC electric power generation system. Therefore, the Project incorporates the commercially important aspects of the operation of the LPMEOH™ Process which would enhance IGCC power generation. These important aspects of LPMEOH™ Process integrations are:

- *The coproduction of electric power and of high value liquid transportation fuels and/or chemical feedstocks from coal. This coproduction requires that the partial conversion of synthesis gas to storable liquid products be demonstrated.*
- *Using an energy load following operating concept which allows conversion of off-peak energy, at attendant low value, into peak energy commanding a higher value. The load-following concept makes use of gasifier capacity that is under utilized during low-demand periods by using the LPMEOH™ Process to convert the excess synthesis gas to a storable liquid fuel for use in electric power generation during the peak energy periods. This operating concept requires that on/off and synthesis gas load following capabilities be demonstrated...*

During operation, the instrumentation system will allow for the collection of engineering data, analysis and reporting which will be done by on-site technical personnel. Typical reporting will include on-stream factors, material and energy balances, reactor and equipment performance, comparison with laboratory and LaPorte Alternative Fuels Development Unit (AFDU) results, conversion efficiencies and catalyst activity...

#### Secondary Objective

A secondary objective of the Project is to demonstrate the production of DME (Dimethyl ether) as a mixed coproduct with methanol...



Subject to Design Verification Testing (DVT), the Partnership proposes to enhance the Project by including the demonstration of the slurry reactor's capability to produce DME as a mixed co-product with methanol...

DVT is required to address issues such as catalyst activity and stability and to provide data for engineering design and demonstration decision making...

At the conclusion of the DVT Steps, a joint Partnership/DOE decision will be made regarding continuation of the methanol/DME demonstration. Timing of the final decision must ensure that the necessary design, procurement, construction and commissioning can be completed to allow for (Phase 3, Task 2.2) operation at the end of the primary LPMEOH™ process demonstration period."

The full Demonstration Test Plan (issued September 1996) provides details in the strategy and conditions to be tested during the four-year operating period.

#### **4. Environmental Monitoring Plan (EMP) Description**

Air Products Liquid Phase Conversion Company, L.P., has constructed and is operating the 260 ton-per-day Liquid Phase Methanol (LPMEOH™) Demonstration Unit at the Eastman Chemical facility in Kingsport, Tennessee. As specified in the Cooperative Agreement, the Partnership developed an Environmental Monitoring Plan (EMP) (issued August 1996) which describes in detail the environmental monitoring activities to be performed during the operation of the LPMEOH™ Demonstration Unit. The purpose of the EMP is to: 1) document the extent of compliance monitoring activities, i.e., those activities required to meet permit requirements, 2) confirm the specific environmental impacts predicted in the National Environmental Policy Act documentation, and 3) establish an information base for the assessment of the environmental performance of the technology for future commercialization.

The EMP describes three categories of environmental monitoring which are performed as a result of the operation of the LPMEOH™ Demonstration Unit. Details of streams internal to the demonstration unit are available in the Technical Progress Reports for the Project.

##### **4.1 Eastman Reporting of Publicly Available Technical Data**

As defined in the Statement of Work for the Demonstration Project, Eastman will provide data on three areas of operation of the Chemicals-from-Coal complex (refer to Table 4.1 for a breakdown of the streams to be monitored):

- 1) Gasifier material balance data
- 2) 10C-30 Guard Bed operating data
- 3) Wastewater and alcohols to wastewater treatment system

This technical information provides information from Eastman's existing facilities to provide an overall assessment of the LPMEOH™ technology. A Special Topical Report will provide this information. Updates, if any, are included in Quarterly EMRs if a significant change occurs.

#### **4.2 Compliance Monitoring**

Four areas of compliance monitoring have been identified to satisfy the permit requirements for the demonstration unit (Table 4.2):

- 1) Combined Vapor Flow from Demonstration Unit to Boiler
- 2) Fugitive Emissions
- 3) Particulate Emissions
- 4) Wastewater Treatment System Outlet Stream

Each of these sources is monitored at a frequency mandated by the relevant permit or industrial hygiene practice. The EMRs will include the results of any compliance monitoring generated during the reporting period.

#### **4.3 Supplemental Monitoring**

Three areas of supplemental monitoring have been identified in the EMP (Table 4.3):

##### Summary of Major Material Balance Streams for Demonstration Unit

The major feed streams (CO Gas, H<sub>2</sub> Gas, Balanced Gas) and product flows (Refined Grade Methanol, Crude Grade Methanol, Main Plant Purge) are provided as a summary table of the cumulative stream flows for the reporting period.

##### Solid/Liquid Discharges

Four other streams can be generated from the demonstration unit:

- 1) Compressor and Pump Lubricants
- 2) Oil Recovered in Oil/Water Separator
- 3) Spent Catalyst
- 4) 29C-40 Guard Bed Adsorbent

Any quantities generated during the reporting period are included in the EMR.

##### Noise

The EMP identified that a noise survey around the 29K-01 Recycle Compressor was planned during the initial start-up of the demonstration unit.

**TABLE 4.1**

**LPMEOH™ DEMONSTRATION UNIT**

**PUBLICLY AVAILABLE TECHNICAL DATA FROM EASTMAN  
CHEMICALS-FROM-COAL COMPLEX**

**Environmental Media**

**General Parameters**

Coal	Pressure, Temperature, Coal Analysis
Oxygen to Gasifier	Pressure, Temperature, %O <sub>2</sub>
Water to Gasifier	Pressure, Temperature
Waste Water from Gasifier	Pressure, Temperature, Total Organic Carbon
Clean Synthesis Gas from Gasifier	Pressure, Temperature, Flow
Sulfur Recovered from Gasifier	Pressure, Temperature, Flow, %S
Carbon Dioxide from Gasifier	Pressure, Temperature, Flow, %CO <sub>2</sub>
Slag from Gasifier	Pressure, Temperature, Flow
Balanced Gas from 10C-30 Guard Bed	Pressure, Temperature, Flow, Composition
Wastewater and Alcohols to Wastewater Treatment System	Flow, Composition, BOD

**TABLE 4.2**  
**LPMEOH™ DEMONSTRATION UNIT**  
**COMPLIANCE MONITORING**

**Environmental Media**

**General Parameters**

Combined Vapor Flow from Demonstration  
Unit to Boiler

Composition

Fugitive Emissions

Leak Detection and Repair (LDAR)  
Report, Volatile Organic Carbon (VOC),  
Background Ambient CO Concentration

Particulate Emissions

Threshold Limit Value (TLV)

Wastewater Treatment System Outlet  
Stream

Flow, Total Organic Carbon, pH

**TABLE 4.3**

**LPMEOH™ DEMONSTRATION UNIT  
SUPPLEMENTAL MONITORING**

<b><u>Environmental Media</u></b>	<b><u>General Parameters</u></b>
CO Gas to LPMEOH™ Demonstration Unit	Cumulative Flow for Quarter
H <sub>2</sub> Gas to LPMEOH™ Demonstration Unit	Cumulative Flow for Quarter
Balanced Gas to LPMEOH™ Demonstration Unit	Cumulative Flow for Quarter
Main Vapor Purge from LPMEOH™ Demonstration Unit	Cumulative Flow for Quarter
Refined Grade Methanol	Cumulative Flow for Quarter
Crude Grade Methanol	Cumulative Flow for Quarter
Compressor and Pump Lubricants	Weight or Volume
Oil Recovered in Oil/Water Separator	Weight or Volume
Spent Catalyst	Weight, Weight% Solids
29C-40 Guard Bed Adsorbent	Weight or Volume
Noise Survey for 29K-01 Recycle Compressor	dBa

## **5. Project Summary**

Synthesis gas was first introduced to the LPMEOH™ Demonstration Unit on 02 April 1997. The nameplate capacity of 80,000 gallons of methanol per day (260 tons-per-day) was achieved on 06 April 1997. During the reporting period, availability for the LPMEOH™ Demonstration Unit exceeded 99%, as the plant continued to operate through the longest continuous campaign to date (45 days) as of 31 March 1998. Table 5.1 summarizes the onstream time and outages of the LPMEOH™ Demonstration Unit during the reporting period.

## **6. Updates on Eastman "Chemicals-from-Coal" Facility Publicly Available Technical Data**

### **6.1 Gasifier Facility**

As defined in Section 7.1 of the Environmental Monitoring Plan, publicly available technical data from the Eastman "Chemicals-from-Coal" facility, which includes data on the streams associated with the Gasifier facility, will be issued in a Special Topical Report. If a significant change in gasifier facility operation (e.g., feedstock change, equipment modifications or additions, etc.) occurs, then an update will be provided in a future EMR.

### **6.2 10C-30 Catalyst Guard Bed**

As defined in Section 7.1 of the Environmental Monitoring Plan, publicly available technical data on the trace impurities entering and leaving the Catalyst Guard Bed will be issued in a Special Topical Report.

During the reporting period, there was no change of adsorbent or process change related to the operation of the 10C-30 Catalyst Guard Bed. If a significant change occurs, then an update will be provided in a future EMR.

### **6.3 Wastewater and Alcohols to Wastewater Treatment System**

The report on publicly available technical data from the Eastman "Chemicals-from-Coal" facility, which includes data on the streams associated with the wastewater and alcohols to the Wastewater Treatment System, will be issued in a Special Topical Report. This will consist of a comparison of the flow, composition, and BOD load of this stream before and after the addition of the LPMEOH™ Demonstration Unit.

Table 5.1

Summary of LPMEOH™ Demonstration Plant Onstream Time and Outages - January/March 1998

Operation Start	Operation End	Operating Hours	Shutdown Hours	Reason for Shutdown
1/1/98 00:01	1/14/98 05:23	317.4	0.2	High-Pressure Methanol Separator (29C-03) Outlet Screen Plugged
1/14/98 05:35	1/14/98 05:43	0.1	0.1	Emergency Shutdown on Steam Drum (29C-02) Level
1/14/98 05:49	1/14/98 07:53	2.1	0.4	Emergency Shutdown on Steam Drum (29C-02) Level
1/14/98 08:17	1/23/98 00:20	208.1	55.9	Syngas Outage
1/25/98 08:15	2/13/98 07:15	455.0	29.0	Syngas Outage
2/14/98 12:15	2/14/98 15:55	3.7	0.2	Emergency Shutdown on Steam Drum (29C-02) Level
2/14/98 16:10	3/31/98 23:59	1087.8		End of Reporting Period
Total Operating Hours				2074.1
Syngas Available Hours				2075.1
Plant Availability, %				99.95

## **7. Compliance Monitoring**

### **7.1 Combined Vapor Flow from Demonstration Unit to Boiler**

A sample of the header gas from the LPMEOH™ Demonstration Unit must be analyzed as part of the Boiler and Industrial Furnace regulations within RCRA. Sampling is currently required every three years. During the development of the EMP, it was anticipated that the new tie-in from the LPMEOH™ Demonstration Unit to the Eastman fuel header would require testing as a new source. After the EMP was published, it was determined that the new tie-in was not considered a significant change and did not require testing. Therefore, with the current sampling schedule, the next sample will be taken in February of 2000.

No activity occurred during the reporting period.

### **7.2 Fugitive Emissions**

#### **7.2.1 Leak Detection and Repair (LDAR)**

No activity occurred during the reporting period. The next report on Leak Detection and Repair at the LPMEOH™ Demonstration Unit is scheduled for the third quarter of calendar year 1998.

#### **7.2.2 Ambient Carbon Monoxide Background Concentration**

This one-time study will record the concentration of CO that is encountered by a LPMEOH™ operations person during the course of a normal day of plant operations.

No activity occurred during the reporting period. The ambient CO background concentration study is now scheduled to be performed during the second quarter of calendar year 1998.

### **7.3 Particulate Emissions**

This one-time study was completed in July of 1997, and documents the exposure level to particulate emissions that is encountered by a LPMEOH™ operations person during the catalyst charging process. The report on this study is included in Environmental Monitoring Report No. 1. Some engineering modifications to the catalyst loading system are planned to reduce the dust concentration and potential personnel exposure.

### **7.4 Wastewater Treatment System Outlet Stream**

The reports on the outfall from the Wastewater Treatment System (Discharge Number 002) for the reporting period is attached in Appendix B. There were no permit excursions.

A process stream within the existing Eastman facility which is impacted by the operation of the LPMEOH™ Demonstration Unit contains the byproduct alcohols and water which are



generated in parallel with the production of methanol. This stream is sent to the Eastman Wastewater Treatment System. As noted in Section 6.3, a comparison of the flow, composition, and BOD load of this stream before and after the addition of the LPMEOH™ Demonstration Unit will be included in a Special Topical Report on publicly available technical data from the Eastman "Chemicals-from-Coal" facility.

## **8. Supplemental Monitoring**

### **8.1 Total Synthesis Gas Use and Methanol Production**

Table 8.1 contains the summary of the major process flows to and from the LPMEOH™ Demonstration Unit for the reporting period. Approximately 5,800,000 gallons (19,000 tons) of methanol (Refined and Crude Grades) were produced during the reporting period.

### **8.2 Oil/Water Separator**

No oil was removed from the Oil/Water Separator during the reporting period.

### **8.3 Compressor and Pump Lubricants**

No material was generated during the reporting period.

### **8.4 Spent Catalyst Slurry**

A total of 90,800 pounds of methanol synthesis catalyst were removed from the LPMEOH™ reactor during the outage between 03 November and 19 December 1997. This material was shipped to the off-site catalyst reclaimer during the reporting period.

### **8.5 29C-40 Catalyst Guard Bed Spent Adsorbent**

In November of 1997, the adsorbent in the 29C-40 Catalyst Guard Bed was removed and replaced with fresh material. Approximately 6,300 pounds of activated carbon were removed from the vessel (placed into drums). The spent activated carbon was sent offsite for disposal during the reporting period.

### **8.6 Noise**

The results of noise dosimetry measurements of the entire LPMEOH™ Demonstration Unit were reported in Environmental Monitoring Report No. 1. The results of an area noise survey at each platform of the LPMEOH™ Demonstration Unit and around the 29K-01 Recycle Compressor were reported in Environmental Monitoring Report No. 2. No additional surveys were performed during the reporting period.

**Table 8-1**

**Synthesis Gas Use and Methanol Production - January/March 1998  
LPMEOH™ Demonstration Unit**

	January 1998	February 1998	March 1998	Total
<b>Consumption, KSCF</b>				
Balanced Gas	488,748.0	448,421.4	508,217.0	1,445,386.4
CO Gas	0.0	0.8	40.0	40.8
H <sub>2</sub> Gas	0.0	0.0	0.0	0.0
<b>Production, Tons</b>				
Crude Methanol	2,322.1	1,453.6	2,002.5	5,778.2
Refined Methanol	4,509.7	4,078.0	4,650.8	13,238.5
Total Purge Gas, KSCF	31,911.9	53,454.7	54,988.2	140,354.8

## **9. Compliance**

### **9.1 Compliance with Permit Limits**

There were no excursions outside permit limits associated with the operation of the LPMEOH™ Demonstration Unit.

## **10. Problems and Recommendations**

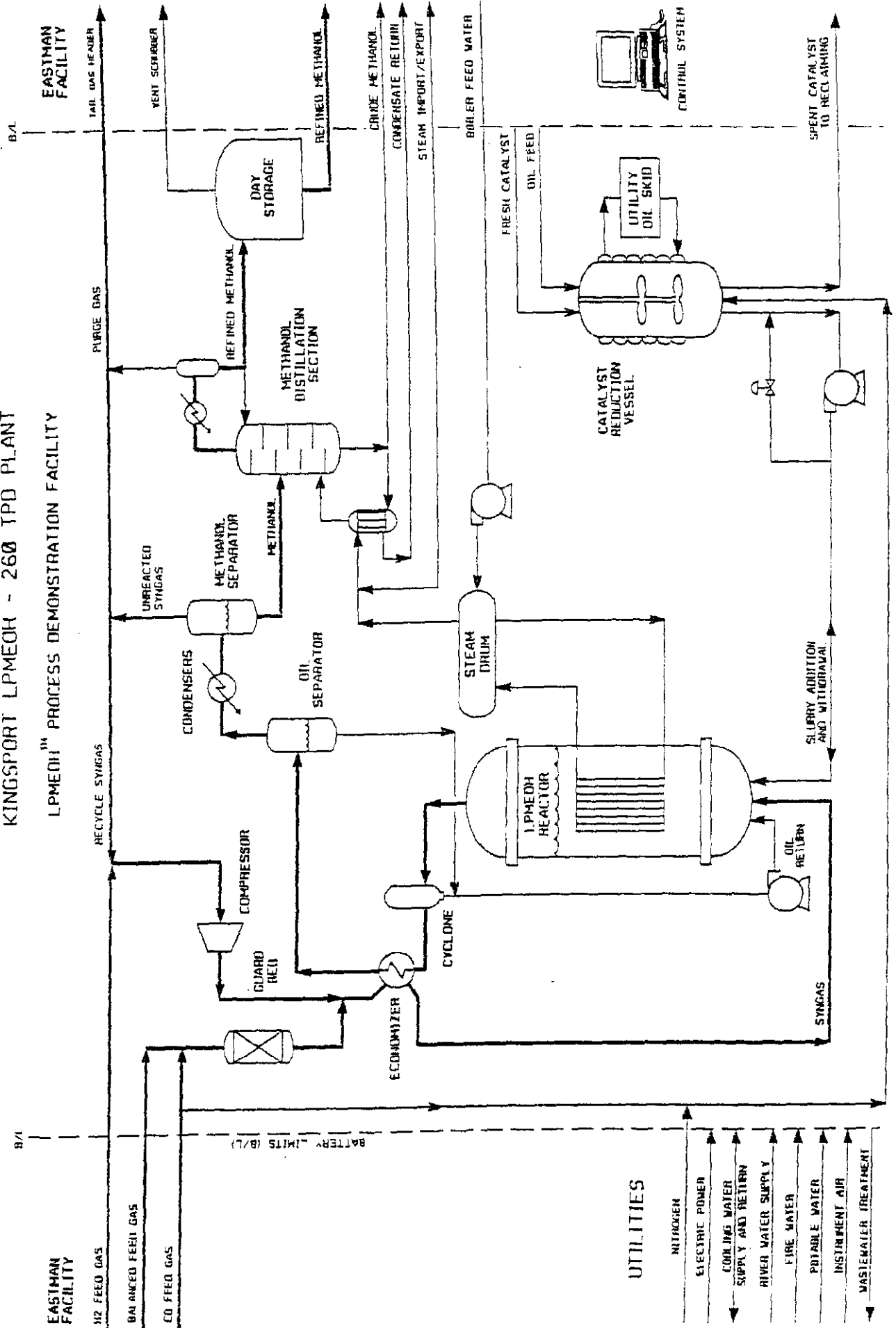
There have been no significant problems arising in the environmental area.

**APPENDICES**

**APPENDIX A - SIMPLIFIED PROCESS FLOW DIAGRAM**

# SIMPLIFIED PROCESS DIAGRAM KINGSFORD LPMEOH - 260 TPD PLANT

## LPMEOH™ PROCESS DEMONSTRATION FACILITY



**APPENDIX B - NPDES REPORTS FOR WASTEWATER TREATMENT SYSTEM  
OUTLET STREAM**

PERMITTEE NAME/ADDRESS:

TN EASTMAN DIVISION  
 DIVISION OF EASTMAN CHEMICAL CO  
 P O BOX 1993  
 KINGSPORT, TN 37662-5393  
 Facility: TN EASTMAN - KINGSPORT  
 Location: SULLIVAN COUNTY TN 37662-5393

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

TN0002640  
 PERMIT NUMBER

002 G  
 DISCHARGE NUMBER

MAJOR (SUBR 06)

F - FINAL

INDUSTRIAL PROCESS WASTEWATER  
 EFFLUENT

FORM APPROVED

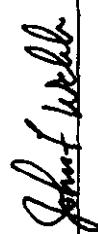
OMB No 2040-0004

\*\*\* NO DISCHARGE [ ] \*\*\*

NOTE: Read instructions before completing this form.

MONITORING PERIOD

FROM 98-01-01 TO 98-01-31

PARAMETER (32-37)	PH	SAMPLE MEASUREMENT	PERMIT REQUIREMENT	(3 Card Only) (46-53)		Loading Unit	(4 Card Only) (38-45)		Quality or Concentration (54-61)		NO. EX (62-63)	Frequency of analysis (64-68)	Sample Type (69-70)
				Average	Maximum		Minimum	Average	Maximum	Unit			
00400 1 0 0		EFFLUENT GROSS VALUE		*****	*****		7.1	*****	7.5	(12)	0	Continuous	N/A
		SOLIDS, TOTAL		*****	*****	****	6.0	*****	9.0	SU	0	CONTINUOUS	RECORDER
00530 1 0 0		SUSPENDED		1.338	2,140	(26)	*****	*****	*****		0	31/31	Composite
		EFFLUENT GROSS VALUE		11111	35954	LBS/DAY	*****	*****	*****	****	0	DAILY	COMPOSITE
		NITROGEN, AMMONIA		<34	150	(26)	*****	<0.2	1	(19)	0	31/31	Composite
00610 2 0 0		TOTAL (AS N)		6000	12000	LBS/DAY	*****	30.5	61	MG/L	0	DAILY	COMPOSITE
		EFFLUENT NET VALUE		BDL	BDL	(26)	*****	BDL	BDL	(19)	0	1/7	Grab
		CYANIDE, TOTAL (AS CN)		14.51	104.83	LBS/DAY	*****	0.058	0.419	MG/L	0	WEEKLY	GRAB
00720 2 0 0		EFFLUENT NET VALUE		2.99	4.95	(26)	*****	0.014	0.021	(19)	0	1/7	Composite
		CHROMIUM, TOTAL (AS CR)		12.51	25.02	LBS/DAY	*****	0.050	0.100	MG/L	0	WEEKLY	COMPOSITE
01034 2 0 0		EFFLUENT NET VALUE		<1.67	2.66	(26)	*****	<0.008	0.011	(19)	0	1/7	Composite
		COPPER, TOTAL (AS CU)		12.51	25.02	LBS/DAY	*****	0.050	0.100	MG/L	0	WEEKLY	COMPOSITE
01042 2 0 0		EFFLUENT NET VALUE		BDL	BDL	(26)	*****	BDL	BDL	(19)	0	1/7	Composite
		LEAD, TOTAL (AS PB)		43.03	172.64	LBS/DAY	*****	0.172	0.690	MG/L	0	WEEKLY	COMPOSITE
01051 2 0 0		EFFLUENT NET VALUE		BDL	BDL	(26)	*****	BDL	BDL	(19)	0	1/7	Composite
		NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 USC §1001 AND 31 USC §1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO \$10,000 AND/OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS)									
		H. H. Holliman, President											
		Tennessee Eastman Division		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER  OFFICER OR AUTHORIZED AGENT									
		TYPED OR PRINTED		AREA CODE NUMBER (423) 229-2000 YEAR MO DAY 98 - 02 - 11									

(Reference all attachments here)

COMMENT AND EXPLANATION OF ANY VIOLATIONS

In addition to taking reasonable steps to prevent instances of noncompliance through the implementation of SPCC and SPCC-type plans, employee training, etc. when a potentially significant instance occurs, we notify the Division and provide information concerning the steps taken or planned to reduce, eliminate, and prevent recurrence of the instance.

EPA FORM 3320-1 (REV. 9-88) Previous editions may be used.

(REPLACES EPA FORM T-40 WHICH MAY NOT BE USED)

PERMITTEE NAME/ADDRESS:  
 TN EASTMAN DIVISION  
 DIVISION OF EASTMAN CHEMICAL CO.  
 P.O. BOX 1993  
 KINGSPORT, TN 37662-5393

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)  
 DISCHARGE MONITORING REPORT (DMR)  
 002 G  
 DISCHARGE NUMBER

MAJOR (SUBR 06)  
 F - FINAL  
 INDUSTRIAL PROCESS WASTEWATER  
 EFFLUENT

FORM APPROVED  
 OMB No 2040-0004

Facility: TN EASTMAN - KINGSPORT  
 Location: SULLIVAN COUNTY TN 37662-5393

MONITORING PERIOD  
 FROM 98-01-01 TO 98-01-31

\*\*\* NO DISCHARGE [ ] \*\*\*  
 NOTE: Read instructions before completing this form.

PARAMETER (32-37)	X	(3 Card Only) (46-53)		(4 Card Only) (38-45)		Quality or Concentration (46-53) (54-61)		NO. EX (62-63)	Frequency of analysis (64-69)	Sample Type (69-70)
		Average	Maximum	Minimum	Average	Maximum	Unit			
NICKEL, TOTAL (AS NI)	SAMPLE MEASUREMENT	4.84	9.74	*****	0.022	0.042	(19)	0	1/7	Composite
01067 2 0 0	PERMIT REQUIREMENT	422.84	995.80	*****	1.690	3.980	DAILY MAX	0	WEEKLY	COMPOSITE
EFFLUENT NET VALUE	SAMPLE MEASUREMENT	35.16	100.64	*****	0.157	0.432	(19)	0	1/7	Composite
ZINC, TOTAL (AS ZN)	PERMIT REQUIREMENT	158.00	317.75	*****	0.635	1.270	DAILY MAX	0	WEEKLY	COMPOSITE
01092 2 0 0	SAMPLE MEASUREMENT	24.79	27.91	*****	*****	*****	*****	0	Continuous	N/A
EFFLUENT NET VALUE	PERMIT REQUIREMENT	REPORT MON AVG	REPORT DAILY MAX	*****	*****	*****	*****	0	CONTINUOUS	RECORDER
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	645	934	*****	*****	*****	*****	0	31/31	Composite
50050 1 0 0	PERMIT REQUIREMENT	6000	13000	*****	*****	*****	*****	0	DAILY	COMPOSITE
EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT									
BOD, CARBONACEOUS 05 DAY, 20C	PERMIT REQUIREMENT									
80082 2 W 0	SAMPLE MEASUREMENT									
EFFLUENT NET VALUE	PERMIT REQUIREMENT									
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER		TELEPHONE		DATE		AREA CODE NUMBER		YEAR MO DAY
H. H. Holliman, President		<i>John F. Welch</i>		(423) 229-2000		98-02-11				
Tennessee Eastman Division		OFFICER OR AUTHORIZED AGENT								
TYPED OR PRINTED										

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 USC 1001 AND 33 USC 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO \$10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS.)

COMMENT AND EXPLANATION OF ANY VIOLATIONS  
 (Reference all attachments here)

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EPA FORM 3320-1 (REV. 9-88) Previous editions may be used. (REPLACES EPA FORM T-40 WHICH MAY NOT BE USED )

PAGE 3 OF 6



PERMITTEE NAME/ADDRESS:  
 TN EASTMAN DIVISION  
 DIVISION OF EASTMAN CHEMICAL CO.  
 P.O. BOX 1993  
 KINGSPORT, TN 37662-5393  
 Facility: TN EASTMAN - KINGSPORT  
 Location: SULLIVAN COUNTY TN 37662-5393

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)  
 MAJOR (SUBR 06)  
 DISCHARGE MONITORING REPORT (DMR)  
 TN0002640  
 002 G  
 PERMIT NUMBER  
 DISCHARGE NUMBER

FORM APPROVED  
 OMB No. 2040-0004

INDUSTRIAL PROCESS WASTEWATER  
 EFFLUENT

MONITORING PERIOD

FROM 98-02-01 TO 98-02-28

\*\* NO DISCHARGE [ ] \*\*

NOTE: Read instructions before completing this form.

PARAMETER (32-37)	SAMPLE MEASUREMENT PERMIT REQUIREMENT	(3 Card Only) (46-53)		(4 Card Only) (38-45)		Quantity or Concentration (54-61)		NO. EX (62-63)	Frequency of Analysis (64-68)	Sample Type (69-70)
		AVERAGE	MINIMUM	MINIMUM	AVERAGE	MAXIMUM	UNIT			
PH	SAMPLE MEASUREMENT	*****	6.9	*****	*****	7.6	(12)	0	Continuous	N/A
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*****	6.0	*****	*****	9.0	SU	0	CONTINUOUS	RECORDER
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	2,652	5,481	*****	*****	*****	(26)	0	28/28	Composite
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	11111 MON AVG	35954 DAILY MAX	*****	*****	*****	LBS/DAY	0	DAILY	COMPOSITE
NITROGEN, AMMONIA TOTAL (AS N)	SAMPLE MEASUREMENT	< 61	165	*****	*****	1	(26)	0	28/28	Composite
00610 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	6000 MON AVG	12000 DAILY MAX	*****	*****	61	LBS/DAY	0	DAILY	COMPOSITE
CYANIDE, TOTAL (AS CN)	SAMPLE MEASUREMENT	BDL	BDL	*****	*****	BDL	(26)	0	1/7	Grab
00720 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	14.51 MON AVG	104.83 DAILY MAX	*****	*****	0.419	LBS/DAY	0	WEEKLY	GRAB
CHROMIUM, TOTAL (AS CR)	SAMPLE MEASUREMENT	2.90	3.91	*****	*****	0.015	(26)	0	1/7	Composite
01034 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	12.51 MON AVG	25.02 DAILY MAX	*****	*****	0.100	LBS/DAY	0	WEEKLY	COMPOSITE
COPPER, TOTAL (AS CU)	SAMPLE MEASUREMENT	3.87	7.42	*****	*****	0.020	(26)	0	1/7	Composite
01042 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	12.51 MON AVG	25.02 DAILY MAX	*****	*****	0.100	LBS/DAY	0	WEEKLY	COMPOSITE
LEAD, TOTAL (AS PB)	SAMPLE MEASUREMENT	BDL	BDL	*****	*****	BDL	(26)	0	1/7	Composite
01051 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	43.03 MON AVG	172.64 DAILY MAX	*****	*****	0.690	LBS/DAY	0	WEEKLY	COMPOSITE
NAME / TITLE PRINCIPAL EXECUTIVE OFFICER	H. H. Holliman, President Tennessee Eastman Division SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER <i>John F. Webb</i> OFFICER OR AUTHORIZED AGENT									
TYPED OR PRINTED	TELEPHONE (423) 229-2000 AREA CODE NUMBER YEAR MO DAY 98 - 03 - 11									

(Reference all attachments here)

COMMENT AND EXPLANATION OF ANY VIOLATIONS  
 In addition to taking reasonable steps to prevent instances of noncompliance through the implementation of SPCC and SPCC-type plans, employee training, etc. when a potentially significant instance occurs, we notify the Division and provide information concerning the steps taken or planned to reduce, eliminate, and prevent recurrence of the instance.

PERMITTEE NAME/ADDRESS:  
 TN EASTMAN DIVISION  
 DIVISION OF EASTMAN CHEMICAL CO.  
 P.O. BOX 1993  
 KINGSPOST, TN 37662-5393  
 Facility: TN EASTMAN - KINGSPOST

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)  
 DISCHARGE MONITORING REPORT (DMR)  
 MAJOR (SUBR 06)  
 F - FINAL  
 INDUSTRIAL PROCESS WASTEWATER  
 EFFLUENT

FORM APPROVED  
 OMB No. 2040-0004

MONITORING PERIOD  
 FROM 98-02-01 TO 98-02-28

Location: SULLIVAN COUNTY TN 37662-5393

NOTE: Read instructions before completing this form.  
 \*\* NO DISCHARGE [ ] \*\*

PARAMETER (32-37)	SAMPLE MEASUREMENT PERMIT REQUIREMENT	(3 Card Only) (46-53)			Quantity or Loading (4 Card Only) (38-45)			Concentration (54-61)			NO. EX (62-63)	Frequency of Analysis (64-68)	Sample Type (69-70)
		AVERAGE	MAXIMUM	UNIT	MINIMUM	AVERAGE	MAXIMUM	UNIT	MAXIMUM	UNIT			
NICKEL, TOTAL (AS NI)	MEASUREMENT	4.07	4.56	(26)	*****	0.021	0.024	(19)	0	1/7	Composite		
01067 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	422.84 MON AVG	995.80 DAILY MAX	LBS/DAY	*****	1.690 MON AVG	3.980 DAILY MAX	MG/L		WEEKLY	COMPOSITE		
ZINC, TOTAL (AS ZN)	MEASUREMENT	24.78	40.09	(26)	*****	0.125	0.188	(19)	0	1/7	Composite		
01092 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	158.00 MON AVG	317.75 DAILY MAX	LBS/DAY	*****	0.635 MON AVG	1.270 DAILY MAX	MG/L		WEEKLY	COMPOSITE		
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	MEASUREMENT	23.15	25.58	(03)	*****	*****	*****	*****	0	Continuous	N/A		
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MON AVG	REPORT DAILY MAX	MGD	*****	*****	*****	*****		CONTINUOUS	RECORDER		
BOD, CARBONACEOUS 05 DAY, 20C	MEASUREMENT	1,401	3,057	(26)	*****	*****	*****	*****	0	28/28	Composite		
80082 2 W 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	6000 MON AVG	13,000 DAILY MAX	LBS/DAY	*****	*****	*****	*****		DAILY	COMPOSITE		
	MEASUREMENT												
	PERMIT REQUIREMENT												
	MEASUREMENT												
	PERMIT REQUIREMENT												
	MEASUREMENT												
	PERMIT REQUIREMENT												
NAME / TITLE PRINCIPAL EXECUTIVE OFFICER H. H. Holliman, President Tennessee Eastman Division TYPED OR PRINTED SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT OFFICER OR AUTHORIZED AGENT TELEPHONE (423) 229-2000 AREA CODE NUMBER DATE 98-03-11 YEAR MO DAY													

IN CERTAIN STATES OF LAW THAT THE DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY SUPERVISION OR CONTROL IN A STATE DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION AND REPORTS FOR THE PERSONS OR PERSONS WHO MANAGE THE SYSTEM OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR OBTAINING THE INFORMATION SUBMITTED TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

(Reference all attachments here)

COMMENT AND EXPLANATION OF ANY VIOLATIONS

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EPA FORM 3320-1 (REV. 9-88) Previous editions may be used. (REPLACES EPA FORM T-40 WHICH MAY NOT BE USED.)

PERMITTEE NAME/ADDRESS:

TN EASTMAN DIVISION  
 DIVISION OF EASTMAN CHEMICAL CO.  
 P. O. BOX 1993  
 KINGSPOST, TN 37662-5393  
 Facility: TN EASTMAN - KINGSPOST  
 Location: SULLIVAN COUNTY TN 37662-5393

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

FORM APPROVED  
 OMB No. 2040-0004

DISCHARGE MONITORING REPORT (DMR)  
 MAJOR (SUBR 06)  
 F - FINAL  
 TN0002640  
 002 G  
 PERMIT NUMBER  
 DISCHARGE NUMBER

INDUSTRIAL PROCESS WASTEWATER  
 EFFLUENT

MONITORING PERIOD

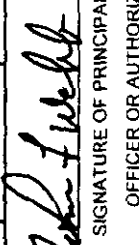
FROM 98-03-01 TO 98-03-31

\*\* NO DISCHARGE [ ] \*\*

NOTE: Read instructions before completing this form.

PARAMETER (32-37)	MEASUREMENT	Quantity or Loading (4 Card Only) (38-45)			Quantity or Concentration (54-61)			NO. EX (62-63)	Frequency of Analysis (64-68)	Sample Type (69-70)
		AVERAGE (46-53)	MINIMUM (38-45)	MAXIMUM (54-61)	AVERAGE (46-53)	MINIMUM (38-45)	MAXIMUM (54-61)			
PH	SAMPLE MEASUREMENT	*****	7.1	*****	*****	7.7	(12)	0	Continuous	N/A
	PERMIT REQUIREMENT	*****	6.0	*****	*****	9.0	SU		CONTINUOUS	RECORDER
00400 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	1.279	2,223	*****	*****	*****		0	31/31	Composite
	PERMIT REQUIREMENT	1111	35954	DAILY MAX	*****	*****			DAILY	COMPOSITE
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	57	410	(26)	*****	2	(19)	0	31/31	Composite
	PERMIT REQUIREMENT	6000	12000	DAILY MAX	*****	61	MG/L		DAILY	COMPOSITE
NITROGEN, AMMONIA TOTAL (AS N)	SAMPLE MEASUREMENT	BDL	BDL	(26)	*****	BDL	(19)	0	1/7	Grab
	PERMIT REQUIREMENT	14.51	104.83	DAILY MAX	*****	0.058	MG/L		WEEKLY	GRAB
00610 2 0 0 EFFLUENT NET VALUE	SAMPLE MEASUREMENT	2.21	3.44	(26)	*****	0.011	(19)	0	1/7	Composite
	PERMIT REQUIREMENT	12.51	25.02	DAILY MAX	*****	0.100	MG/L		WEEKLY	COMPOSITE
CHROMIUM, TOTAL (AS CR)	SAMPLE MEASUREMENT	2.15	3.30	(26)	*****	0.011	(19)	0	1/7	Composite
	PERMIT REQUIREMENT	12.51	25.02	DAILY MAX	*****	0.100	MG/L		WEEKLY	COMPOSITE
01034 2 0 0 EFFLUENT NET VALUE	SAMPLE MEASUREMENT	12.51	25.02	DAILY MAX	*****	0.050	MG/L		WEEKLY	COMPOSITE
	PERMIT REQUIREMENT	12.51	25.02	DAILY MAX	*****	0.100	MG/L		WEEKLY	COMPOSITE
COPPER, TOTAL (AS CU)	SAMPLE MEASUREMENT	<7.91	<8.96	(26)	*****	<0.040	(19)	0	1/7	Composite
	PERMIT REQUIREMENT	43.03	172.64	DAILY MAX	*****	0.690	MG/L		WEEKLY	COMPOSITE
01051 2 0 0 EFFLUENT NET VALUE	SAMPLE MEASUREMENT	43.03	172.64	DAILY MAX	*****	0.690	MG/L		WEEKLY	COMPOSITE
	PERMIT REQUIREMENT	43.03	172.64	DAILY MAX	*****	0.690	MG/L		WEEKLY	COMPOSITE

NAME / TITLE PRINCIPAL EXECUTIVE OFFICER  
 H. H. Holliman, President  
 Tennessee Eastman Division

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER  


OFFICER OR AUTHORIZED AGENT  
 TELEPHONE  
 (423) 229-2000  
 AREA CODE NUMBER  
 YEAR MO DAY  
 98 - 04 - 09

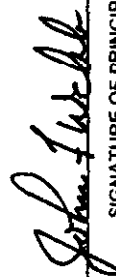
COMMENT AND EXPLANATION OF ANY VIOLATIONS  
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MONITORING PERIOD  
 FROM 98-01-01 TO 98-03-31

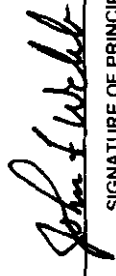
FROM 98-01-01 TO 98-03-31

PARAMETER (32-37)	SAMPLE MEASUREMENT	(3 Card Only) (46-53)		Loading Unit	(4 Card Only) (38-45)		Quantity or Average (46-53)	Concentration (54-61)		NO EX (62-63)	Frequency of analysis (64-68)	Sample Type (69-70)		
		Average	Maximum		Minimum	Maximum		Unit						
CARBON TETRACHLORIDE	SAMPLE MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
	PERMIT REQUIREMENT	4.50 MON AVG	9.51 DAILY MAX	LBS/DAY	*****	*****	0.018 MON AVG	DAILY MAX	MG/L	QUARTERLY	GRAB			
1,2-DICHLOROETHANE	SAMPLE MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
	PERMIT REQUIREMENT	17.01 MON AVG	52.79 DAILY MAX	LBS/DAY	*****	*****	0.068 MON AVG	DAILY MAX	MG/L	QUARTERLY	GRAB			
CHLOROFORM	SAMPLE MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
	PERMIT REQUIREMENT	5.25 MON AVG	11.51 DAILY MAX	LBS/DAY	*****	*****	0.021 MON AVG	DAILY MAX	MG/L	QUARTERLY	GRAB			
TOLUENE	SAMPLE MEASUREMENT	0.03	0.03	(26)	0.03	0.03	*****	0.0002	(19)	0	1/Quarter	Grab		
	PERMIT REQUIREMENT	6.51 MON AVG	20.02 DAILY MAX	LBS/DAY	*****	*****	0.026 MON AVG	DAILY MAX	MG/L	QUARTERLY	GRAB			
ACENAPHTHYLENE	SAMPLE MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
	PERMIT REQUIREMENT	2.00 MON AVG	4.06 DAILY MAX	LBS/DAY	*****	*****	0.008 MON AVG	DAILY MAX	MG/L	QUARTERLY	GRAB			
34200 2 0 0	SAMPLE MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
	PERMIT REQUIREMENT	5.50 MON AVG	14.76 DAILY MAX	LBS/DAY	*****	*****	0.022 MON AVG	DAILY MAX	MG/L	QUARTERLY	GRAB			
ACRYLONITRILE	SAMPLE MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
	PERMIT REQUIREMENT	24.02 MON AVG	60.55 DAILY MAX	LBS/DAY	*****	*****	0.096 MON AVG	DAILY MAX	MG/L	QUARTERLY	GRAB			
34215 2 0 0	SAMPLE MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
PERMIT REQUIREMENT	24.02 MON AVG	60.55 DAILY MAX	LBS/DAY	*****	*****	0.096 MON AVG	DAILY MAX	MG/L	QUARTERLY	GRAB	TELEPHONE	DATE		
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER											SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER		AREA CODE NUMBER	
H. H. Holliman, President													(423) 229-2000	
Tennessee Eastman Division											OFFICER OR AUTHORIZED AGENT		98 - 04 - 09	
TYPED OR PRINTED											YEAR MO DAY		98 - 04 - 09	

COMMENT AND EXPLANATION OF ANY VIOLATIONS  
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\*\*\* NO DISCHARGE [ ] \*\*\*  
 NOTE: Read instructions before completing this form.

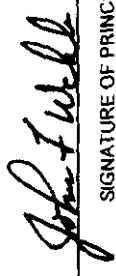
MONITORING PERIOD  
 FROM 98-01-01 TO 98-03-31

PARAMETER (32-37)	SAMPLE MEASUREMENT	(3 Card Only) (46-53)		Loading Unit	Quantity or (54-61)		Quality or (46-53)		Concentration (54-61)		NO. EX (62-63)	Frequency of analysis (64-68)	Sample Type (69-70)
		Average	Maximum		Minimum	Average	Maximum	Unit					
34220 2 0 0 EFFLUENT NET VALUE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	*****	(19)	0	1/Quarter	Grab	
BENZENE, DISSOLVED	PERMIT REQUIREMENT	0.25 MON. AVG	0.41 DAILY MAX	LBS/DAY	0.001 MON. AVG	0.002 DAILY MAX	*****	*****	MG/L	0	QUARTERLY	GRAB	
34235 2 0 0 EFFLUENT NET VALUE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	*****	(19)	0	1/Quarter	Grab	
BENZO (K) FLUORANTHENE	PERMIT REQUIREMENT	9.26 MON. AVG	34.03 DAILY MAX	LBS/DAY	0.037 MON. AVG	0.136 DAILY MAX	*****	*****	MG/L	0	QUARTERLY	GRAB	
34242 2 0 0 EFFLUENT NET VALUE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	*****	(19)	0	1/Quarter	Grab	
BENZO (A) PYRENE	PERMIT REQUIREMENT	2.00 MON. AVG	4.06 DAILY MAX	LBS/DAY	0.008 MON. AVG	0.016 DAILY MAX	*****	*****	MG/L	0	QUARTERLY	GRAB	
34247 2 0 0 EFFLUENT NET VALUE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	*****	(19)	0	1/Quarter	Grab	
CHLOROBENZENE	PERMIT REQUIREMENT	2.00 MON. AVG	4.06 DAILY MAX	LBS/DAY	0.008 MON. AVG	0.016 DAILY MAX	*****	*****	MG/L	0	QUARTERLY	GRAB	
34301 2 0 0 EFFLUENT NET VALUE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	*****	(19)	0	1/Quarter	Grab	
CHRYSENE	PERMIT REQUIREMENT	3.75 MON. AVG	7.01 DAILY MAX	LBS/DAY	0.015 MON. AVG	0.028 DAILY MAX	*****	*****	MG/L	0	QUARTERLY	GRAB	
34320 2 0 0 EFFLUENT NET VALUE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	*****	(19)	0	1/Quarter	Grab	
DIETHYL PHTHALATE	PERMIT REQUIREMENT	0.25 MON. AVG	0.41 DAILY MAX	LBS/DAY	0.001 MON. AVG	0.002 DAILY MAX	*****	*****	MG/L	0	QUARTERLY	GRAB	
34336 2 0 0 EFFLUENT NET VALUE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	*****	*****	(19)	0	1/Quarter	Grab	
34336 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	20.27 MON. AVG	50.79 DAILY MAX	LBS/DAY	0.081 MON. AVG	0.203 DAILY MAX	*****	*****	MG/L	0	QUARTERLY	GRAB	
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER H. H. Holliman, President Tennessee Eastman Division TYPED OR PRINTED													
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER  OFFICER OR AUTHORIZED AGENT													
TELEPHONE (423) 229-2000											AREA CODE NUMBER 98 - 04 - 09		
YEAR MO DAY											YEAR MO DAY		

COMMENT AND EXPLANATION OF ANY VIOLATIONS  
 In addition to taking reasonable steps to prevent instances of noncompliance through the implementation of SPCC and SPCC-type plans, employee training, etc. when a potentially significant instance occurs, we notify the Division and provide information concerning the steps taken or planned to reduce, eliminate, and prevent recurrence of the instance  
 EPA FORM 3320-1 (REV. 9-88) Previous editions may be used.  
 (REPLACES EPA FORM T-40 WHICH MAY NOT BE USED.)

\*\*\* NO DISCHARGE  \*\*\*  
 NOTE: Read instructions before completing this form.

MONITORING PERIOD  
 FROM 98-01-01 TO 98-03-31

PARAMETER (32-37)	SAMPLE MEASUREMENT PERMIT REQUIREMENT	(3 Card Only) (46-53)		Loading Unit	Concentration (54-61)		NO. EX (62-63)	Frequency of analysis (64-68)	Sample Type (69-70)
		Average	Maximum		Minimum	Average			
DIMETHYL PHTHALATE	SAMPLE MEASUREMENT PERMIT REQUIREMENT	BDL	BDL	(26)	BDL	BDL	0	1/Quarter	Grab
34341 2 0 0	EFFLUENT NET VALUE	4.75	11.76	LBS/DAY	MON AVG	DAILY MAX		QUARTERLY	GRAB
FLUORANTHENE	SAMPLE MEASUREMENT PERMIT REQUIREMENT	BDL	BDL	(26)	BDL	BDL	0	1/Quarter	Grab
34376 2 0 0	EFFLUENT NET VALUE	6.26	17.01	LBS/DAY	MON AVG	DAILY MAX		QUARTERLY	GRAB
FLUORENE	SAMPLE MEASUREMENT PERMIT REQUIREMENT	BDL	BDL	(26)	BDL	BDL	0	1/Quarter	Grab
34381 2 0 0	EFFLUENT NET VALUE	0.25	0.41	LBS/DAY	MON AVG	DAILY MAX		QUARTERLY	GRAB
HEXACHLOROBUTADIENE	SAMPLE MEASUREMENT PERMIT REQUIREMENT	BDL	BDL	(26)	BDL	BDL	0	1/Quarter	Grab
34391 2 0 0	EFFLUENT NET VALUE	5.00	12.26	LBS/DAY	MON AVG	DAILY MAX		QUARTERLY	GRAB
HEXACHLOROETHANE	SAMPLE MEASUREMENT PERMIT REQUIREMENT	BDL	BDL	(26)	BDL	BDL	0	1/Quarter	Grab
34396 2 0 0	EFFLUENT NET VALUE	5.25	13.51	LBS/DAY	MON AVG	DAILY MAX		QUARTERLY	GRAB
METHYL CHLORIDE	SAMPLE MEASUREMENT PERMIT REQUIREMENT	BDL	BDL	(26)	BDL	BDL	0	1/Quarter	Grab
34418 2 0 0	EFFLUENT NET VALUE	21.52	47.54	LBS/DAY	MON AVG	DAILY MAX		QUARTERLY	GRAB
METHYLENE CHLORIDE	SAMPLE MEASUREMENT PERMIT REQUIREMENT	BDL	BDL	(26)	BDL	BDL	0	1/Quarter	Grab
34423 2 0 0	EFFLUENT NET VALUE	10.01	22.27	LBS/DAY	MON AVG	DAILY MAX		QUARTERLY	GRAB
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER <b>H. H. Holliman, President</b> Tennessee Eastman Division TYPED OR PRINTED									
SIGNATURE OF PRINCIPAL EXECUTIVE  OFFICER OR AUTHORIZED AGENT									
AREA CODE NUMBER (423) 229-2000 YEAR MO DAY 98 - 04 - 09									

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY KNOWLEDGE OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 USC § 1001 AND 31 USC § 1319. PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO \$10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 3 YEARS.

(Reference all attachments here)

COMMENT AND EXPLANATION OF ANY VIOLATIONS

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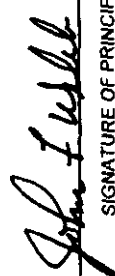
(REPLACES EPA FORM T-40 WHICH MAY NOT BE USED)

002 Q  
 DISCHARGE NUMBER

PERMIT NUMBER  
 TN0002640

MONITORING PERIOD  
 FROM 98-01-01 TO 98-03-31

\*\*\* NO DISCHARGE [ ] \*\*\*  
 NOTE: Read instructions before completing this form.

PARAMETER (32-37)	(3 Card Only) (46-53)		Quantity or (54-61)		Loading Unit	(4 Card Only) (38-45)		Quality or (46-53)		Concentration (54-61)		NO. EX (62-63)	Frequency of analysis (64-68)	Sample Type (69-70)	
	Average	MON AVG	Maximum	DAILY MAX		Minimum	Average	Maximum	Unit	MON AVG	DAILY MAX				Unit
NITROBENZENE	*****	*****	BDL	BDL	(26)	*****	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
34447 2 0 0 EFFLUENT NET VALUE	6.76	MON AVG	17.01	DAILY MAX	LBS/DAY	*****	0.027	MON AVG	0.068	MG/L	0	QUARTERLY	GRAB		
PHENANTHRENE	*****	*****	BDL	BDL	(26)	*****	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
34461 2 0 0 EFFLUENT NET VALUE	0.25	MON AVG	0.41	DAILY MAX	LBS/DAY	*****	0.001	MON AVG	0.002	MG/L	0	QUARTERLY	GRAB		
PYRENE	*****	*****	BDL	BDL	(26)	*****	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
34469 2 0 0 EFFLUENT NET VALUE	0.25	MON AVG	0.41	DAILY MAX	LBS/DAY	*****	0.001	MON AVG	0.002	MG/L	0	QUARTERLY	GRAB		
TETRACHLOROETHYLENE	*****	*****	0.57	0.57	(26)	*****	0.003	MON AVG	0.056	(19)	0	1/Quarter	Grab		
34475 2 0 0 EFFLUENT NET VALUE	5.50	MON AVG	14.01	DAILY MAX	LBS/DAY	*****	0.022	MON AVG	0.056	MG/L	0	QUARTERLY	GRAB		
1,1 - DICHLOROETHANE	*****	*****	BDL	BDL	(26)	*****	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
34496 2 0 0 EFFLUENT NET VALUE	5.50	MON AVG	14.76	DAILY MAX	LBS/DAY	*****	0.022	MON AVG	0.059	MG/L	0	QUARTERLY	GRAB		
1,1 - DICHLOROETHYLENE	*****	*****	BDL	BDL	(26)	*****	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
34501 2 0 0 EFFLUENT NET VALUE	4.00	MON AVG	6.26	DAILY MAX	LBS/DAY	*****	0.016	MON AVG	0.025	MG/L	0	QUARTERLY	GRAB		
1,1,1 - TRICHLOROETHANE	*****	*****	BDL	BDL	(26)	*****	BDL	*****	BDL	(19)	0	1/Quarter	Grab		
34506 2 0 0 EFFLUENT NET VALUE	5.25	MON AVG	13.51	DAILY MAX	LBS/DAY	*****	0.021	MON AVG	0.054	MG/L	0	QUARTERLY	GRAB		
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER H. H. Holliman, President Tennessee Eastman Division TYPED OR PRINTED SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT 															
												(423) 229-2000	AREA CODE NUMBER	98-04-09	YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)  
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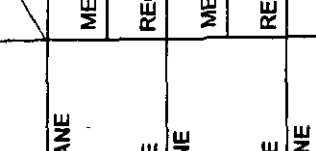


\*\*\* NO DISCHARGE  \*\*\*  
 NOTE: Read instructions before completing this form.

MONITORING PERIOD  
 FROM 98 - 01 - 01 TO 98 - 03 - 31

PARAMETER (32-37)	(3 Card Only) (46-53)		Quantity or (54-61)		Loading		(4 Card Only) (38-45)		Quality or (46-53)		Concentration (54-61)		NO EX (62-63)	Frequency of analysis (64-68)	Sample Type (69-70)
	Average	MON AVG	Maximum	DAILY MAX	Unit	Unit	Minimum	Average	Maximum	Unit	Unit				
1,1,2 - TRICHLOROETHANE	*****	5.25	BDL	13.51	(26)	BDL	*****	*****	*****	BDL	(19)	0	1/Quarter	Grab	
EFFLUENT NET VALUE	MON AVG	DAILY MAX	DAILY MAX	DAILY MAX	LBS/DAY	DAILY MAX	MON AVG	MON AVG	MON AVG	0.054	MG/L	0	QUARTERLY	GRAB	
BENZO (A) ANTHRACENE	*****	2.00	BDL	4.06	(26)	BDL	*****	*****	*****	BDL	(19)	0	1/Quarter	Grab	
EFFLUENT NET VALUE	MON AVG	DAILY MAX	DAILY MAX	DAILY MAX	LBS/DAY	DAILY MAX	MON AVG	MON AVG	MON AVG	0.016	MG/L	0	QUARTERLY	GRAB	
1,2 - DICHLOROBENZENE	*****	19.27	BDL	40.78	(26)	BDL	*****	*****	*****	BDL	(19)	0	1/Quarter	Grab	
EFFLUENT NET VALUE	MON AVG	DAILY MAX	DAILY MAX	DAILY MAX	LBS/DAY	DAILY MAX	MON AVG	MON AVG	MON AVG	0.163	MG/L	0	QUARTERLY	GRAB	
1,2 - DICHLOROPROPANE	*****	38.28	BDL	57.55	(26)	BDL	*****	*****	*****	BDL	(19)	0	1/Quarter	Grab	
EFFLUENT NET VALUE	MON AVG	DAILY MAX	DAILY MAX	DAILY MAX	LBS/DAY	DAILY MAX	MON AVG	MON AVG	MON AVG	0.230	MG/L	0	QUARTERLY	GRAB	
1,2 - TRANS - DICHLOROETHYLENE	*****	5.25	BDL	13.51	(26)	BDL	*****	*****	*****	BDL	(19)	0	1/Quarter	Grab	
EFFLUENT NET VALUE	MON AVG	DAILY MAX	DAILY MAX	DAILY MAX	LBS/DAY	DAILY MAX	MON AVG	MON AVG	MON AVG	0.054	MG/L	0	QUARTERLY	GRAB	
1,2,4 - TRICHLORO - BENZENE	*****	17.01	BDL	35.03	(26)	BDL	*****	*****	*****	BDL	(19)	0	1/Quarter	Grab	
EFFLUENT NET VALUE	MON AVG	DAILY MAX	DAILY MAX	DAILY MAX	LBS/DAY	DAILY MAX	MON AVG	MON AVG	MON AVG	0.140	MG/L	0	QUARTERLY	GRAB	
1,3 - DICHLOROPROPENE, TOTAL WEIGHT	*****	7.26	BDL	11.01	(26)	BDL	*****	*****	*****	BDL	(19)	0	1/Quarter	Grab	
EFFLUENT NET VALUE	MON AVG	DAILY MAX	DAILY MAX	DAILY MAX	LBS/DAY	DAILY MAX	MON AVG	MON AVG	MON AVG	0.044	MG/L	0	QUARTERLY	GRAB	

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER  
 H. H. Holliman, President  
 Tennessee Eastman Division  
 TYPED OR PRINTED

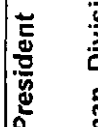
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER  
  
 OFFICER OR AUTHORIZED AGENT

AREA CODE NUMBER  
 (423) 229-2000  
 YEAR MO DAY  
 98 - 04 - 09

COMMENT AND EXPLANATION OF ANY VIOLATIONS  
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MONITORING PERIOD  
 FROM 98-01-01 TO 98-03-31

PARAMETER (32-37)	(3 Card Only) (46-53)		(4 Card Only) (38-45)		Quality or (46-53)		Concentration (54-61)		NO. EX (62-63)	Frequency of analysis (64-66)	Sample Type (69-70)
	Average	Maximum	Minimum	Maximum	Average	Maximum	Unit	Unit			
1,3 - DICHLOROBENZENE	7.76 MON AVG	BDL	*****	BDL	*****	BDL	(19)	(19)	0	1/Quarter	Grab
34566 2 0 0 EFFLUENT NET VALUE	7.76 MON AVG	11.01 DAILY MAX	*****	11.01 DAILY MAX	0.031 MON AVG	0.044 DAILY MAX	(26)	(19)	0	QUARTERLY	GRAB
1,4 - DICHLOROBENZENE	3.75 MON AVG	BDL	*****	BDL	*****	BDL	(26)	(19)	0	1/Quarter	Grab
34571 2 0 0 EFFLUENT NET VALUE	3.75 MON AVG	7.01 DAILY MAX	*****	7.01 DAILY MAX	0.015 MON AVG	0.028 DAILY MAX	(26)	(19)	0	QUARTERLY	GRAB
2 - CHLOROPHENOL	7.76 MON AVG	BDL	*****	BDL	*****	BDL	(26)	(19)	0	1/Quarter	Grab
34586 2 0 0 EFFLUENT NET VALUE	7.76 MON AVG	24.52 DAILY MAX	*****	24.52 DAILY MAX	0.031 MON AVG	0.098 DAILY MAX	(26)	(19)	0	QUARTERLY	GRAB
2 - NITROPHENOL	10.26 MON AVG	BDL	*****	BDL	*****	BDL	(26)	(19)	0	1/Quarter	Grab
34591 2 0 0 EFFLUENT NET VALUE	10.26 MON AVG	17.26 DAILY MAX	*****	17.26 DAILY MAX	0.041 MON AVG	0.069 DAILY MAX	(26)	(19)	0	QUARTERLY	GRAB
2,4 - DICHLOROPHENOL	9.76 MON AVG	BDL	*****	BDL	*****	BDL	(26)	(19)	0	1/Quarter	Grab
34601 2 0 0 EFFLUENT NET VALUE	9.76 MON AVG	28.02 DAILY MAX	*****	28.02 DAILY MAX	0.039 MON AVG	0.112 DAILY MAX	(26)	(19)	0	QUARTERLY	GRAB
2,4 - DIMETHYLPHENOL	4.50 MON AVG	BDL	*****	BDL	*****	BDL	(26)	(19)	0	1/Quarter	Grab
34606 2 0 0 EFFLUENT NET VALUE	4.50 MON AVG	9.01 DAILY MAX	*****	9.01 DAILY MAX	0.018 MON AVG	0.036 DAILY MAX	(26)	(19)	0	QUARTERLY	GRAB
2,4 - DINITROTOLUENE	28.27 MON AVG	BDL	*****	BDL	*****	BDL	(26)	(19)	0	1/Quarter	Grab
34611 2 0 0 EFFLUENT NET VALUE	28.27 MON AVG	71.31 DAILY MAX	*****	71.31 DAILY MAX	0.113 MON AVG	0.285 DAILY MAX	(26)	(19)	0	QUARTERLY	GRAB
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER H. H. Holliman, President SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER 											
Tennessee Eastman Division TYPED OR PRINTED OFFICER OR AUTHORIZED AGENT											

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PERMITTEE NAME/ADDRESS:  
 TN EASTMAN DIVISION  
 DIVISION OF EASTMAN CHEMICAL CO.  
 P.O. BOX 1993  
 KINGSPOST, TN 37662-5393

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)  
 DISCHARGE MONITORING REPORT (DMR)  
 002 Q  
 DISCHARGE NUMBER

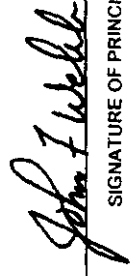
MAJOR (SUBR 06)  
 F - FINAL  
 PROCESSED WW QUARTERLY REPORT  
 EFFLUENT

FORM APPROVED  
 OMB No 2040-0004

Facility: TN EASTMAN - KINGSPOST  
 Location: SULLIVAN COUNTY TN 37662-5393

MONITORING PERIOD  
 FROM 98-01-01 TO 98-03-31

\*\*\* NO DISCHARGE [ ] \*\*\*  
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PARAMETER (32-37)	(3 Card Only) (46-53)		Quantity or (54-61)		Loading Unit	(4 Card Only) (38-45)		Quality or (46-53)		Concentration (54-61)	Unit	NO. EX (62-63)	Frequency of analysis (64-66)	Sample Type (69-70)					
	Average	PERMIT REQUIREMENT	Maximum	DAILY MAX		Minimum	Average	Maximum	Average						Maximum				
2,4 - DINITROPHENOL	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	BDL	BDL	BDL	(19)	0	1/Quarter	Grab						
34616 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	17.76 MON AVG	30.77 DAILY MAX	LBS/DAY	*****	*****	0.071 MON AVG	0.123 DAILY MAX	MG/L	MG/L	0	QUARTERLY	GRAB						
2,6 - DINITROTOLUENE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	BDL	BDL	BDL	(19)	0	1/Quarter	Grab						
34626 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	63.80 MON AVG	160.38 DAILY MAX	LBS/DAY	*****	*****	0.255 MON AVG	0.641 DAILY MAX	MG/L	MG/L	0	QUARTERLY	GRAB						
4 - NITROPHENOL	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	BDL	BDL	BDL	(19)	0	1/Quarter	Grab						
34646 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	18.01 MON AVG	31.02 DAILY MAX	LBS/DAY	*****	*****	0.072 MON AVG	0.124 DAILY MAX	MG/L	MG/L	0	QUARTERLY	GRAB						
4,6 - DINITRO - O - CRESOL	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	BDL	BDL	BDL	(19)	0	1/Quarter	Grab						
34657 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	19.52 MON AVG	69.31 DAILY MAX	LBS/DAY	*****	*****	0.078 MON AVG	0.277 DAILY MAX	MG/L	MG/L	0	QUARTERLY	GRAB						
PHENOL, SINGLE COMPOUND	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	BDL	BDL	BDL	(19)	0	1/Quarter	Grab						
34694 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	3.75 MON AVG	6.51 DAILY MAX	LBS/DAY	*****	*****	0.015 MON AVG	0.026 DAILY MAX	MG/L	MG/L	0	QUARTERLY	GRAB						
NAPHTHALENE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	BDL	BDL	BDL	(19)	0	1/Quarter	Grab						
34696 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	5.50 MON AVG	14.76 DAILY MAX	LBS/DAY	*****	*****	0.022 MON AVG	0.059 DAILY MAX	MG/L	MG/L	0	QUARTERLY	GRAB						
ETHYL BENZENE	MEASUREMENT	BDL	BDL	(26)	BDL	BDL	BDL	BDL	BDL	(19)	0	1/Quarter	Grab						
37371 2 0 0 EFFLUENT NET VALUE	PERMIT REQUIREMENT	8.01 MON AVG	27.02 DAILY MAX	LBS/DAY	*****	*****	0.032 MON AVG	0.108 DAILY MAX	MG/L	MG/L	0	QUARTERLY	GRAB						
I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 USC .1001 AND 31 USC .1119. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO \$10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 3 YEARS.)																			
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER H. H. Holliman, President Tennessee Eastman Division TYPED OR PRINTED												SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER  OFFICER OR AUTHORIZED AGENT		TELEPHONE (423) 229-2000		AREA CODE NUMBER 98 - 04 - 09		YEAR MO DAY	

COMMENT AND EXPLANATION OF ANY VIOLATIONS

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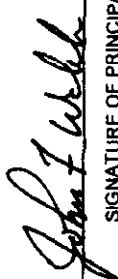
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MONITORING PERIOD  
 FROM 98-01-01 TO 98-03-31

Facility: TN EASTMAN - KINGSPORT  
 Location: SULLIVAN COUNTY TN 37662-5393

PARAMETER (32-37)	SAMPLE MEASUREMENT	(3 Card Only) (46-53)		Loading Unit	Quantity or (54-61)		(4 Card Only) (38-45)		Quality or (46-53)		Concentration (54-61)	NO. EX (62-63)	Frequency of analysis (64-69)	Sample Type (69-70)	
		Average	Maximum		Minimum	Maximum	Average	Maximum	Unit						
BIS (2-ETHYLHEXYL) PHTHALATE	39100 2 0 0	25.77	BDL	(26)	BDL	69.81	BDL	*****	*****	*****	BDL	0	1/Quarter	Grab	
EFFLUENT NET VALUE	PERMIT REQUIREMENT	MON AVG	DAILY MAX	LBS/DAY	DAILY MAX	DAILY MAX	DAILY MAX	*****	MON AVG	MON AVG	0.278	0	QUARTERLY	GRAB	
DI-N-BUTYL PHTHALATE	39110 2 0 0	6.76	BDL	(26)	BDL	14.26	BDL	*****	*****	*****	BDL	0	1/Quarter	Grab	
EFFLUENT NET VALUE	PERMIT REQUIREMENT	MON AVG	DAILY MAX	LBS/DAY	DAILY MAX	DAILY MAX	DAILY MAX	*****	MON AVG	MON AVG	0.057	0	QUARTERLY	GRAB	
VINYL CHLORIDE	39175 2 0 0	26.02	BDL	(26)	BDL	67.05	BDL	*****	*****	*****	BDL	0	1/Quarter	Grab	
EFFLUENT NET VALUE	PERMIT REQUIREMENT	MON AVG	DAILY MAX	LBS/DAY	DAILY MAX	DAILY MAX	DAILY MAX	*****	MON AVG	MON AVG	0.268	0	QUARTERLY	GRAB	
TRICHLOROETHYLENE	39180 2 0 0	5.25	BDL	(26)	BDL	13.51	BDL	*****	*****	*****	BDL	0	1/Quarter	Grab	
EFFLUENT NET VALUE	PERMIT REQUIREMENT	MON AVG	DAILY MAX	LBS/DAY	DAILY MAX	DAILY MAX	DAILY MAX	*****	MON AVG	MON AVG	0.054	0	QUARTERLY	GRAB	
HEXACHLOROBENZENE	39700 2 0 0	0.05	BDL	(26)	BDL	0.09	BDL	*****	*****	*****	BDL	0	1/Quarter	Grab	
EFFLUENT NET VALUE	PERMIT REQUIREMENT	MON AVG	DAILY MAX	LBS/DAY	DAILY MAX	DAILY MAX	DAILY MAX	*****	MON AVG	MON AVG	0.000186	0	QUARTERLY	GRAB	
3,4-BENZOFUORANTHENE	79531 2 0 0	2.00	BDL	(26)	BDL	4.05	BDL	*****	*****	*****	BDL	0	1/Quarter	Grab	
EFFLUENT NET VALUE	PERMIT REQUIREMENT	MON AVG	DAILY MAX	LBS/DAY	DAILY MAX	DAILY MAX	DAILY MAX	*****	MON AVG	MON AVG	0.018	0	QUARTERLY	GRAB	
CHLOROETHANE	85811 2 0 0	26.02	BDL	(26)	BDL	67.05	BDL	*****	*****	*****	BDL	0	1/Quarter	Grab	
EFFLUENT NET VALUE	PERMIT REQUIREMENT	MON AVG	DAILY MAX	LBS/DAY	DAILY MAX	DAILY MAX	DAILY MAX	*****	MON AVG	MON AVG	0.268	0	QUARTERLY	GRAB	
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER H. H. Holliman, President Tennessee Eastman Division TYPED OR PRINTED SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER  OFFICER OR AUTHORIZED AGENT															
COMMENT AND EXPLANATION OF ANY VIOLATIONS												(423) 229-2000	AREA CODE NUMBER	98-04-09	YEAR MO DAY

IN ADDITION TO TAKING REASONABLE STEPS TO PREVENT INSTANCES OF NONCOMPLIANCE THROUGH THE IMPLEMENTATION OF SPCC AND SPCC-TYPE PLANS, EMPLOYEE TRAINING, ETC. WHEN A POTENTIALLY SIGNIFICANT INSTANCE OCCURS, WE NOTIFY THE DIVISION AND PROVIDE INFORMATION CONCERNING THE STEPS TAKEN OR PLANNED TO REDUCE, ELIMINATE, AND PREVENT RECURRENCE OF THE INSTANCE.

(REPLACES EPA FORM T-40 WHICH MAY NOT BE USED.)

EPA FORM 3320-1 (REV. 9-88) PREVIOUS EDITIONS MAY BE USED.

(Reference all attachments here)

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